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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------|------------------|
| 09/657,971 | 09/08/2000 | Nobumasa Suzuki | 35.C11969 REI | 3511 |
| 5514 | 7590 | 02/27/2004 | EXAMINER | |
| FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112 | | | ALEJANDRO MULERO, LUZ L | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1763 | |

DATE MAILED: 02/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|----------------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/657,971 | SUZUKI, NOBUMASA <i>eb</i> | |
| | Examiner | Art Unit | |
| | Luz L. Alejandro | 1763 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-110 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-18 and 26-49 is/are allowed.
- 6) ☒ Claim(s) 19-25 and 50-110 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19-25 and 50-110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki, JP 7-90591 in view of Inoue, JP 5-62796 and Watanabe et al. JP 7-263186.

Suzuki shows the invention as claimed including a microwave plasma processing apparatus, in which a plasma process is performed, comprising: a plasma generation chamber 1101, separated from ambient air by a first dielectric material 1102; a processing chamber 1111 connected to said plasma generation chamber; means 1113 for supporting a substrate 1112 to be processed; microwave introduction means utilizing an endless annular wave guide 1103 provided outside the first dielectric material which is provided with plural slots 1107; means 1108 for introducing gas into the plasma generation chamber; means 1115 for introducing gas into the processing chamber; evacuation means 1116 (see figures 9A and 9B).

Suzuki does not expressly disclose that the interior of the wave guide is filled with a second dielectric material which is the same as or different from the first dielectric material. Inoue (figs. 1 and 2 and their descriptions) and Watanabe et al. (figs. 1 and 2 and their descriptions) disclose microwave plasma processing apparatuses similar to

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the apparatus disclosed by Suzuki, and in which the wave guide is filled with a dielectric material as to generate a uniform density plasma in the plasma generation chamber as disclosed by Inoue (paragraph 0022) and as to make the transmission section of microwaves small and to make small the cut off frequency of the waveguide as disclosed by Watanabe et al. (paragraphs 0004-0011). In view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus disclosed by Suzuki as to further comprise a wave guide filled of dielectric material because in such way a uniform density plasma is generated, therefore the substrate is uniformly processed, to make the transmission section of microwaves small and as to make small the cut off frequency of the wave guide. With respect to claims 72 and 90, note that the first dielectric material is quartz and the second dielectric material can be Teflon, alumina ceramics or quartz (see Watanabe et al. paragraph 0007), therefore the limitation of the claims is met.

Furthermore, Suzuki et al. at paragraph 0027 discloses that the position of the slots are at a interval of $1/4$ of the guide wavelength which is related to the frequency of the microwaves and the dimension of the cross-section of the waveguide used. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to define the positions of the slots of the apparatus of Suzuki et al. modified by Inoue and Watanabe, depending on the wavelength of the microwaves in the presence of the second dielectric because, as taught by Suzuki et al., the position of the slots depends upon the cross-section of the waveguide which will be affected by the presence of the second dielectric.

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Suzuki et al. disclose a wave guide having a cylindrical shape and which follows the exterior of the first dielectric material. Suzuki also discloses: that the wave guide may also be of other shapes such as a disk, a polygon, or the like (paragraph 0018); magnetic field generating means may be further provided to higher the density of plasma (paragraph 0021), such magnetic field generating means capable of generating the claimed magnetic field of claim 74; optical energy source to irradiate the substrate (paragraphs 0038-0039); high frequency supply means connected to the substrate support (paragraph 0041); and wherein film forming and cleaning processes are performed in the apparatus, also with respect to the processes performed in the apparatus noted that the apparatus is capable of performing different kinds of processes depending in the gases utilized.

With respect to claims 99-110, the Suzuki reference discloses the claimed limitations, see paragraph 0019 and claim 3.

Allowable Subject Matter

Claims 1-18 and 26-49 are allowed.

Response to Arguments

Applicant's arguments filed 11/07/03 have been fully considered but they are not persuasive.

With respect to defining the positions of the slots depending on the wavelength of the microwaves in the presence of the second dielectric, it should be noted, as stated in

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the above rejection, that Suzuki et al. at paragraph 0027 discloses that the position of the slots are at a interval of $1/4$ of the guide wavelength which is related to the frequency of the microwaves and the dimension of the cross-section of the waveguide used. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to define the positions of the slots of the apparatus of Suzuki et al. modified by Inoue and Watanabe, depending on the wavelength of the microwaves in the presence of the second dielectric because, as taught by Suzuki et al., the position of the slots depends upon the cross-section of the waveguide which will be affected by the presence of the second dielectric. Furthermore, the slots position relates to the structure of the waveguide and is controlled during manufacture of the apparatus. One of ordinary skill in the art at the time the invention was made would have defined the position of the slots in the apparatus of Suzuki, JP 7-90591 in view of Inoue, JP 5-62796 and Watanabe et al. JP 7-263186 based upon the particular value of the wavelength that would be expected to be shorter than an apparatus without a dielectric in the waveguide.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by

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combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, and as stated in the above rejection, Inoue disclose having the wave guide filled with a dielectric material as to generate a uniform density plasma in the plasma generation chamber and Watanabe et al. disclose having the wave guide filled with a dielectric material as to make the transmission section of microwaves small and to make small the cut off frequency of the waveguide.

In response to applicant's argument that none of the reference teachings result in enhanced uniform high density plasma and that none of the references teach that the electric field of the standing wave of the annular waveguide tube filled with the second dielectric is stronger than an electric field of the standing wave of an annular waveguide tube not filled with a second dielectric, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Furthermore, note that Inoue disclose having the wave guide filled with a dielectric material as to generate a uniform density plasma in the plasma generation chamber (see, for example, paragraph 0022).

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In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

The declaration under 37 CFR 1.132 filed 12/11/02 is insufficient to overcome the rejection of claims 19-25 and 50-110 based upon Suzuki, JP 7-90591 in view of Inoue, JP 5-62796 and Watanabe et al. JP 7-263186 as set forth in the last Office action because: a showing of unexpected results has not been made in the above mentioned rejection. Note that the reasons provided by Inoue and Watanabe et al. to include a dielectric within the waveguide are the same reasons as those of applicant and that expected beneficial results are evidence of obviousness of a claimed invention, just as unexpected results are evidence of unobviousness thereof (see *In re Gershon*, 372 F.2d 535, 538, 152 USPQ 602, 604 (CCPA 1967)).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 571-272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Luz L. Alejandro
Primary Examiner
Art Unit 1763

February 19, 2004